

MARINE RECREATIONAL INFORMATION PROGRAM

FY Project Plan

Pilot surveys of shoreline fishing effort for HMRFS

Created on

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1. Overview

1.1. Background

The Hawai'i Marine Recreational Fishing Survey (HMRFS) currently conducts an access point creel survey to collect primarily catch information while the Coastal Household Telephone Survey (CHTS) collects effort information. Due to distinct differences between Hawai'i's shoreline characteristics, cultural practices, and fishing methods and those of much of the Mainland, the current access point creel survey does not provide adequate representation of shoreline fishing activities in Hawai'i. In addition, the lack of a non-commercial fishing license database from which to conduct telephone or other types of surveys has resulted in low sample sizes from fishing effort surveys for all modes. For these reasons, we initiated efforts in 2011 to resolve these deficiencies and ultimately provide more accurate fishing effort (participation) and landings estimates for Hawai'i.

A MRIP project was funded in 2012 to review current HMRFS methodologies and evaluate improvement options. As part of the project, a workshop was held in Honolulu from July 16-19, 2012. Attendees included MRIP statistical consultants, NMFS staff from the Office of Science and Technology (OST), Pacific Islands Fisheries Science Center (PIFSC), Pacific Islands Regional Office (PIRO), HMRFS staff (project manager and all field staff), and a Western Pacific Regional Fisheries Management Council (WPRFMC) staff member. The MRIP statistical consultants completed the first draft of the report in late September (2012). The report was based on presentations and discussions at the workshop, as well as follow-up emails and conversations. The draft report was reviewed and commented upon by workshop attendees and was returned to the consultants in early October (2012) for further revision. Both the final draft of the consultant report and a project report (with executive summary) from the project team have been submitted to MRIP (Breidt et al., 2012; Ma et al., 2013).

In the consultants' report, preliminary assessments were provided for charter boat, private boat, and shoreline fishing modes. The consultants stated that survey design improvements should focus on the private boat and shore modes since the charter boat mode is covered by the State's commercial reporting system. For the private boat mode, the consultants supported the use of the vessel registry as a sampling frame for collecting boat-based fishing effort data, especially since the State is undertaking efforts to better understand those who are using their boats to engage in non-commercial fishing activities. A pilot mail-in survey project of registered boaters is nearly complete. For the shoreline mode, on-site effort counts (supplemented by secondary survey methods) were suggested for collecting effort data. A pilot study was recommended to evaluate the feasibility of conducting alternative shoreline effort surveys, to compare them with the CHTS effort estimates, and to explore the potential combination of using several surveys methods to achieve a more comprehensive estimate of fishing effort.

A second MRIP project was funded in 2013 to specifically design alternative pilot survey

methodologies for collecting shore-based fishing effort information in Hawai'i. Similar to the 2012 project, a workshop was held in Honolulu from July 25-26, 2013. The same MRIP statistical consultants, as well as attendees who had participated in the 2012 workshop, attended the 2013 workshop to discuss the design of a pilot survey. Due to the importance of these surveys in Hawai'i, additional members from NMFS as well as several local fishers attended the workshop to provide additional input. On the first day of the workshop, four presentations were given to attendees: 1) an overview of the current status of HMRFS and associated issues and limitations, 2) an overview of survey methods currently conducted in the Western Pacific US territories, and 3) updates on two other ongoing MRIP projects in the Western Pacific Region, a mail-in survey of private boat fishing effort in Hawai'i and a recalibration of participation and landings estimates in Guam using pilot surveys of restricted or private ports and shoreline areas as adjustment factors.

The first presentation of the 2013 workshop was given by the HMRFS project manager who provided an overview of current HMRFS survey limitations emphasizing the large spatial coverage and remoteness of most of the shoreline sites in Hawai'i. Images of various shoreline sites throughout the islands were provided to demonstrate the inherent variability in shoreline characteristics as well as the multitude of access points for many of the more remote areas. A roving creel survey as well as various other on-site and off-site surveys was proposed as possible alternatives to the current access point creel survey and CHTS. Discussions following the presentation addressed various design concerns such as the collection of data associated with gear-hours rather than angler-hours due to the difficulties in counting fishers within large groups. Shoreline fishers in Hawai'i tend to use more than one rod-and-reel at the same time, utilize various types of gear and methods during a trip, camp for several days, and are sometimes mixed with non-fishers within each party. In addition, due to the extensive natural coastlines typically found in Hawai'i, increasing the geographic coverage of the survey would greatly improve the representation of the various fisheries and gear types that occur in Hawai'i. Although avidity bias was not considered to be problematic with a roving survey, a length-of-stay bias was considered unavoidable.

The second presentation was given by two PIFSC staff who provided a joint overview of the sampling methods used by the Western Pacific Fisheries Information Network in American Samoa, Guam and the Commonwealth of the Northern Mariana Islands (Saipan). Roving surveys are used in the territories to collect both catch and effort information for both commercial and non-commercial fishing activities. However, due to variations in the geographic size and distribution of fishers on the different islands, each jurisdiction employs slightly differing methods for collecting catch and fishing effort information. Discussion focused upon potentially modifying and adapting the roving survey methods and possibly some of the methods of expanding effort estimates as used in the territories to Hawai'i based upon similarities in coastal geography, cultural history, and fishing techniques.

The final presentations provided updates for two relevant ongoing MRIP projects: "A Hawai'i regional survey pilot project: testing a mail survey to obtain effort and other data from boat-based

noncommercial fishermen in Hawai'i" and "Pilot surveys at unsampled ports and shoreline to calibrate adjustment factors in the expansion of catch, effort and CPUE from the existing creel survey in Guam." A PIRO staff member provided initial results of the mail-in survey for private boat effort and had indicated an initially promising response rate of about 40% as well as positive feedback from the survey participants thus far. For the second presentation, a WPRFMC staff member outlined the goals of the Guam project and suggested that if the project was successful, similar methods could potentially be used to address similar coverage issues in Hawai'i's military zones and other private coastal areas.

Following the workshop, meeting notes were compiled by OST staff (Bagwill, 2013) which provided detailed summaries of the workshop as well as a meeting report submitted by the consultants (Breidt et al., 2013) which outlined recommendations for pilot testing: 1) roving catch survey (requires modified field form to account for gear-hours, not angler-hours), 2) roving effort survey (overlapping sites spatially and temporally stratified for optimal sample coverage), 3) aerial effort survey (to cover remote and private shoreline areas), and 4) mail-in effort survey (to cover private and remote shoreline areas as well as night fishing activities). A hybrid survey design which incorporates a combination of survey methods was agreed upon by all attendees as the ideal strategy to optimize sampling coverage. Due to limitations in project funding, the consultants suggested providing monthly cost estimates for the proposed surveys that could be used to provide baseline cost estimates to determine both spatial and temporal allocations for field testing at a later date. We thus propose feasibility testing of the roving catch and effort surveys as well as the aerial and mail-in surveys to explore coverage of data gaps associated with the roving effort survey.

1.2. Project Description

Following recommendations from the consultants (Breidt et al., 2012 and 2013), we propose a hybrid survey approach, where an on-site method is supplemented by one or two secondary methods. The on-site pilot survey is the roving creel survey. Both catch and effort data are to be collected using this method. The two secondary methods to be tested are an aerial survey and an address-based mail-in survey. All three surveys will be conducted concurrently with the ongoing HMRFS and CHTS surveys for comparative analyses.

1.3. Objectives

The objectives of the project are to: 1) pilot test the feasibility of the proposed alternative shoreline survey methods and 2) compare pilot data to data collected concurrently from regular HMRFS survey methods.

The proposed pilot surveys take into consideration MRIP pilot studies conducted in other US coastal states that have tested similar methodologies and will thus provide complementary information for these pilot surveys. Due to the unique geographical and cultural characteristics of the Hawaiian Islands, these pilot surveys may provide insight into variables that may not have

been encountered or addressed on the mainland US. The results from the Hawai'i-based pilot surveys are therefore likely to have applicability to US island territories in both the Caribbean and Western Pacific regions.

1.4. References

Bagwill, April. 2013. Hawaii Marine Recreational Fishing Survey Shoreline Pilot Survey Workshop. Breidt, F.J., V. Lesser, and J.D. Opsomer. 2012. Consultant's Report: Preliminary Review of Hawaii Marine Recreational Fishing Survey. Breidt, F.J., V. Lesser, and J.D. Opsomer. 2013. HMRFS Pilot Study Design Meeting Report. Ma, H., T. Ogawa, J. DeMello, J. Breidt, V. Lesser, J. Opsomer, D. Van Voorhees, D. Hamm, T. Sminkey, C. Hawkins, W. Ikehara, and W. Van Buskirk. 2013. A review of the current sampling and estimation methods of the Hawaii Marine Recreational Fishing Survey (HMRFS). FY12 MRIP Project Report (Executive Summary).

2. Methodology

2.1. Methodology

Three pilot surveys are proposed for feasibility testing, all of which would be conducted on the island of O'ahu. The current HMRFS field staff members are ideal candidates to conduct the on-site pilot field tests due to the experience and trusted relationships they have already established with many shoreline fishers. If any current field staff are contracted for pilot survey sampling, these surveys will not conflict with ongoing HMRFS sampling schedules.

Roving Surveys:

Two complementary on-site survey methods to be evaluated are the roving catch and roving effort surveys. Both roving surveys are proposed in order to accommodate for differences in catch rate between the roving survey and the current access point survey. The access point survey collects information based upon completed trips whereas the proposed roving surveys are based upon incomplete trips. In addition, data relative to gear-hours rather than angler-hours would be collected due primarily to difficulties in quantifying angler numbers within large parties. The current intercept form would have to be modified to include number in addition to type of gear used on a trip. A separate form to record shoreline effort would have to be developed to account for gear-hours as well as to record ancillary data such as wind speed, tide, swell height and precipitation. Physical data recorded from the field could then be confirmed with data from NOAA-National Weather Service and other related sources. With these auxiliary data, it would be possible to evaluate the use of model-assisted estimates of effort. A new sampling frame will also be determined using overlapping site clusters with established viewpoints where surveyors can observe fishing activity for predetermined time frames. Sampling for both catch and effort will be stratified by morning and afternoon shifts as well as by site variables such as shoreline topography, types of fisheries, and general fishing pressure. Assignment day types (weekend vs. weekdays) and starting points per site cluster will then be randomized within strata. Field testing is tentatively planned for Waves 4 (July and August) and 5 (September and October) of 2014 to capture fishing activity during the summer (relatively higher effort) as well as during the fall (relatively lower effort). Wave 4 is also the period when several pulse fisheries typically reach their peak. One holiday (Independence Day, Friday) occurs in Wave 4 and two holidays (Labor Day and Columbus Day, both on Mondays) occur in Wave 5.

Aerial Survey:

In conjunction with the roving surveys, two other alternative or supplemental surveys are proposed. The first survey, an aerial survey of O'ahu, would provide a more comprehensive snapshot of shoreline fishing activity, particularly for the remote and private/restricted areas that are relatively inaccessible and unobservable by ground-based surveyors. This study was modeled after an aerial survey of fishing effort that has been routinely conducted on the island of Guam in the Western Pacific to assess remote and restricted coastal areas. From a fixed-wing airplane, continuous digital photographs would be taken of the shoreline area encompassing O'ahu in one

two-hour flight for one complete survey. In order to capture a larger area of the shoreline, including nearshore waters where certain gear types are more likely to be found (eg. spearfishing, gillnetting, etc.), two image resolutions are being proposed: a relatively high resolution of 2cm (200m swath) and a relatively low resolution of 6.5cm (500m swath). Both high and low resolution images would then be stitched together by the contractor to form two full mosaic ortho-images. The high resolution images can be used to validate gear types such as fishing poles that may be difficult to discern from the low resolution images. If sufficient detail can be determined using only the low resolution images, future survey costs, if implemented, can be reduced.

Mail-In Survey:

The second survey, an address-based mail-in survey, would ask potential respondents about non-commercial fishing activity from all shoreline areas including remote, private, and military bases as well as night fishing trips. Though similar in theory to the CHTS, a mail-in survey may be advantageous because a larger sampling frame (all addresses can be sampled and are not limited to households with a landline telephone) may result in a higher completion rate as well as a potentially lower cost per survey. The database provided by the US Postal Service consists of a list of all delivery points receiving US mail and is increasingly used by survey researchers as the frame to conduct general population surveys. A list of random names and addresses of O'ahu residents can be obtained from a private vendor (eg. Andrew Associates, a marketing firm in Enfield, Connecticut). In an effort to maximize response rates, questionnaires would be sent to potential respondents using a modified Dillman Tailored Design Method which emphasizes personalization as well as repeated contacts to increase the likelihood that an individual will complete the questionnaire. Random samples of names and addresses from evenly distributed O'ahu zip codes would be sampled. In addition to effort information, the identification of demographic sub-populations may provide other useful information of shoreline fishers such as what motivates fishing activity. For a target sample size of 900 completed surveys and an expected 40% overall response rate, a pool of approximately 3,000 addresses would be needed to conduct the sampling. A letter from the State and/or NMFS stating the purpose of the upcoming survey would be initially sent to the 3,000 households randomly selected for the mail survey. The primary purpose of the letter is to "personalize" the survey so that fishers will recognize affiliation with local management agencies (not a private solicitor) and thus may be more willing to complete the survey. Assuming a 25% response rate from the first mailing of valid surveys with deliverable addresses, a second round of surveys would be sent to the non-respondents. Assuming a 10% response rate from the second mailing, a final round of surveys would then be sent to the remaining non-respondents with an assumed final response rate of 5%. Due to the quantity and duration of sampling required, cost estimates for this survey are for one Wave (two-month period) only. Of the two Waves designated for feasibility testing of the roving and aerial surveys, the mail-in survey would be conducted during the second Wave so that the responses from the mail survey reflect fishing activity that occurred during the first Wave of pilot testing.

2.2. Regions

2.3. Geographic Coverage

The island of O'ahu, State of Hawai'i.

2.4. Temporal Coverage

Four months (two Waves)

2.5. Frequency

Roving surveys: 60 sample days/month, aerial survey: 2 sample days/month, mail survey: one Wave

2.6. Unit of Analysis

Gear-hours

2.7. Collection Mode

Roving & mail surveys: paper forms, aerial survey: digital photos

3. Communications Plan

3.1. Internal

Monthly (or as needed) conference calls and more frequent email communications will be made among project team members. Documents/data will be distributed/shared via email or posted to MRIP Collaboration Tool.

3.2. External

Monthly updates of the project will be reported to MRIP and a project report will be submitted.

4. Assumptions and Constraints

4.1. New Data

Yes

4.2. Track Costs

Yes

4.3. Funding Vehicle

NMFS-PIFSC (using cooperative agreement with HDAR and/or other contracts)

4.4. Data Resources

Ancillary physical data such as wind speed, swell height, precipitation levels, etc. are to be used as auxiliary information in the computation of effort estimates. Ancillary data collected in the field during roving surveys can be compared to equivalent data from other sources such as the National Weather Service, the US Geological Survey, and other related agencies that routinely collect and archive these data.

4.5. Other Resources

The MRIP statistical consultants' labor will be needed to guide survey design issues as well as to help analyze and compare data sets from the pilot surveys with data concurrently collected by HMRFS.

Contracted field staff and coordinator labor to conduct the roving surveys.

Contractor to conduct the aerial survey.

Contractor to conduct the mail-in survey.

4.6. Regulations

None.

4.7. Other

OMB approval will be needed for data collection forms to be used for the mail survey (for fishing effort) and for onsite interviews (for catch rate) in a roving survey.

5. Risk

5.1. Project Risk

Table 1: Project Risk

| | | | |
|------------------|-------------|------------------|-----------------------------|
| Risk Description | Risk Impact | Risk Probability | Risk Mitigation Approach |
|------------------|-------------|------------------|-----------------------------|

6. Final Deliverables

6.1. Additional Reports

6.2. New Data Sets

6.3. New Systems

7. Project Leadership

7.1. Project Leader and Members

Table 2: Project Members

| Project Role | Name | Organization | Title |
|--------------|------|--------------|-------|
|--------------|------|--------------|-------|

8. Project Estimates

8.1. Project Schedule

Table 3: Project Schedule - Major Tasks and Milestones

| # | Schedule Description | Planned Start | Planned Finish | Prerequisites | Milestones |
|---|----------------------|---------------|----------------|---------------|------------|
|---|----------------------|---------------|----------------|---------------|------------|

8.2. Cost Estimates

Table 4: Cost EstimatesYes

| Project Need | Cost Description | Date Needed | Estimated Cost |
|--------------|------------------|-------------|----------------|
| TOTAL | | | \$0.00 |